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Syncephalis clavata (*Zoopagales, Zygomycetes*), a first record from the neotropics

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Abstract — During a study on the coprophilous fungi from Brazil, the mycoparasitic fungus *Syncephalis clavata* was isolated from lowland paca dung collected at the Reserva Ecológica de Dois Irmãos, located in Recife, State of Pernambuco, Northeastern Brazil. This is the first record of this species in the neotropics and the second occurrence worldwide. Aspects of the morphology, biology and ecology of this species are discussed.

Key words — dung, *Zoopagomycotina*, taxonomy, herbivorous

Introduction

Syncephalis belongs to the subphylum *Zoopagomycotina,* order *Zoopagales* (Hibbett et al. 2007), family *Piptocephalidaceae* (Kirk et al. 2008) and has been described as a haustorial mycoparasite of *Mortierellales* and *Mucorales*, or less commonly of *Ascomycetes* (Benny 2005). This genus was first described by van Tieghem & Le Monnier in 1873, and 60 names have been published in *Syncephalis* (Ho & Benny 2008), representing about 45 species (Kirk et al. 2008). Species in this genus form thin coenocytic hyphae that may grow over the host; the fungi have a well developed rhizoidal system or digitate appressoria that bear simple sporangiophores with an apical fertile swollen head or vesicle giving rise to one to many spored usually cylindrical merosporangia that form directly on the vesicle apex or sporiferous structures (like basal cells) that arise from it, variously shaped smooth or ornamented merospores, and warty, more or less globose zygospores borne on tongue-like suspensors, (Benjamin 1959). *Syncephalis* can be isolated from any habitat that also supports the growth of a suitable host, often being found parasitizing mucoraceous fungi growing in animal dung or soil samples (Indoh 1962).

Syncephalis clavata, characterized by its club-shaped vesicle, doliiform merospores produced in a branched merosporangium and cordate basal cells that usually detach from the vesicle at maturity, was first isolated and described by Ho & Benny (2007) in Taiwan as parasitizing *Thamnostylum piriforme* (Bainier) Arx & H.P. Upadhyay growing in mouse dung.

The material of *S. clavata* described below was isolated from lowland paca dung in Brazil.

Materials & methods

Samples of lowland paca (*Cuniculus paca*) dung were collected in the Zoological Park at Reserva Ecológica de Dois Irmãos (8°7'30"S and 34°52'30"W), located in Recife, State of Pernambuco, Northeast of Brazil. The area comprises an Atlantic Forest Ecological Reserve. The samples were collected with a sterilized spatula, transferred to clean plastic bags, taken to the laboratory and incubated in a moist chamber in 9-cm petri dishes at 28 ± 2°C for 7 days under alternating light and dark periods. The specimen was studied directly from the substrata under a stereomicroscope and a light microscope and described according to Ho & Benny (2007). A slide is deposited in the Pe. Camille Torrend (URM) Herbarium of the Universidade Federal de Pernambuco, Recife, Brazil.

Taxonomy

Syncephalis clavata H.M. Ho & Benny, Bot. Studies 48: 319. 2007. Plate 1

Material examined: **BRAZIL**. **Pernambuco**, Recife, Reserva Ecológica de Dois Irmãos, I.2010, R.F.R. Melo s.n. (URM 82246); idem, IV.2010, R.F.R. Melo s.n. (URM 82247).

Mycelium composed of thin vegetative hyphae, 1–2 μm wide, hyaline. Sporangiophores erect, simple, (105–)175–195(–197.5) μm in length, 75–10 μm wide at the broadest portion near the base, tapering gradually upwards. Rhizoids stout, short. Vesicle indistinct, club-shaped, 7.5–11 μm diam, slightly rounded at the apex. Merosporangia cylindrical, dichotomously branched once at the base, each containing 3 merospores with cordate basal cells measuring 7.5–10 × 3.5–5 μm, usually detached at maturity. Merospores doliiform, 7.5–12.5 × 3.5–5 μm. Zygospores not observed.

Habitat: Parasitizing *Thamnostylum piriforme* growing on lowland paca dung.

Distribution: Brazil and Taiwan. This is the first record from Brazil.

Notes: The characteristics of *Syncephalis clavata* reported here show a close similarity with the descriptions of Ho & Benny (2007). However, we found taller (175–195 μm) and thinner (7.5–10 μm) sporangiophores, smaller vesicles (7.5–11 μm), and longer and shorter merospores (7.5–12.5 μm) than described by Ho & Benny (2007). Despite these minor discrepancies, we do not consider them sufficient to propose a new species. *Syncephalis clavata* can

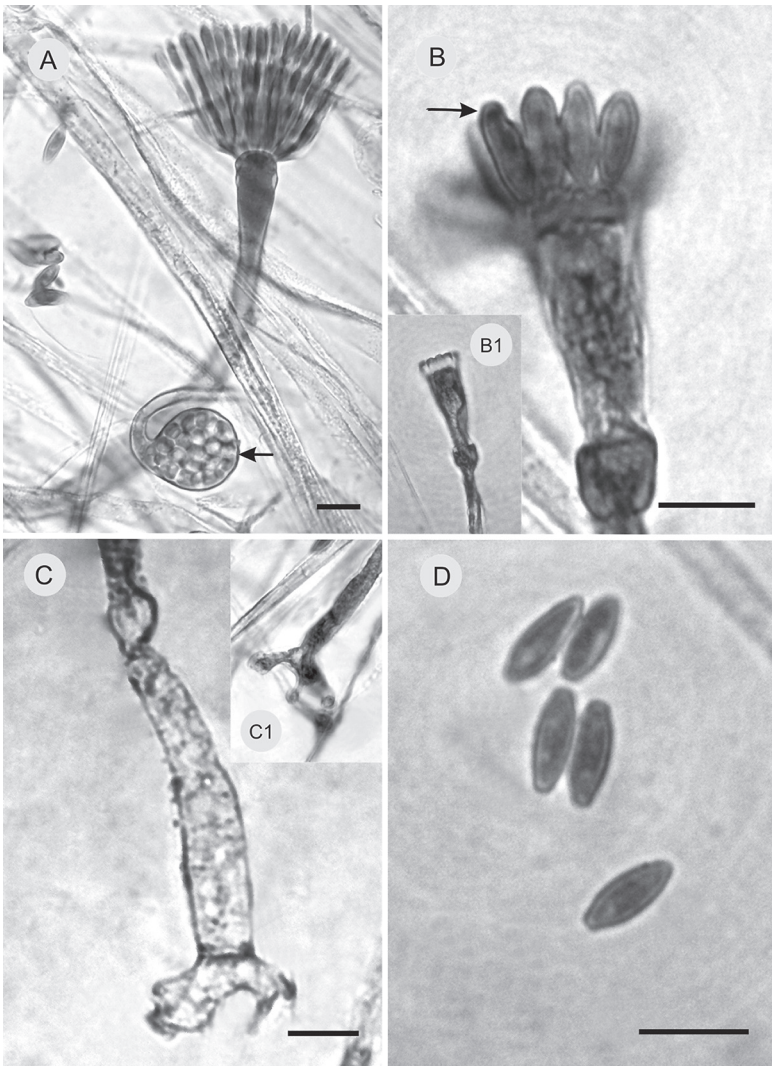

Plate 1. *Syncephalis clavata.* **A**: Sporangiophore with mature merosporangia. A sporangia of *Thamnostylum piriforme* is also visible (arrow). **B–B1**: Sporangiophore bearing cordate basal cells (arrow) attached to the vesicle. **C-C1**: Rhizoids. **D**: Merospores. Scale bars: 10

be distinguished from other species of the genus by its club-shaped vesicle, doliiform merospores, by having 3 merospores per merosporangium, and by spore size.

According to Ho & Benny (2007), the clavate sporangiophore of *S. clavata* closely resembles *S. pygmae,* described by Patil & Patil (1994), but the later differs by the size of the sporangiophores (25–30 × 7–8 μm), number of merospores per merosporangium (4–6) and size of merospores (4–6 × 1–2 μm).

Like the Taiwanese isolate, a Brazilian isolate of *Syncephalis clavata* was also found parasitizing *Thamnostylum piriforme* growing on rodent dung. In Brazil, Trufem (1984) isolated *Syncephalis cornu* and *S. tengi* parasitic on *Mucor mucedo* and Viriato & Trufem (1985) isolated *S. asymmetrica, S. cornu, S. penicillata, S. sphaerica,* and *S. tengi* from herbivore dung. This report describes the first occurrence of *Syncephalis clavata* in Brazil, contributing to the knowledge of the geographical distribution of *Syncephalis*.

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References

Benjamin RK. 1959. The merosporangiferous *Mucorales*. Aliso 4: 321–433.

Benny GL. 2005. *Zygomycetes*. Published on the Internet at http://www.zygomycetes.org.

Hibbett DS, Binder M, Bischoff JF, Blackwell M, Cannon PF, Eriksson OE, Huhndorf S, James T, Kirk PM, Lücking R, Lumbsch HT, Lutzoni F, Matheny PB, McLaughlin DJ, Powell MJ, Redhead S, Schoch CL, Spatafora JW, Stalpers JA, Vilgalys R, Aime MC, Aptroot A, Bauer R, Begerow D, Benny GL, Castlebury LA, Crous PW, Dai YC, Gams W, Geiser DM, Griffith GW, Gueidan C, Hawksworth DL, Hestmark G, Hosaka K, Humber RA, Hyde KD, Ironside JE, Kõljalg U, Kurtzman CP, Larsson KH, Lichtwardt R, Longcore J, Miadlikowska J¸ Miller A, Moncalvo JM, Mozley-Standridge S, Oberwinkler F, Parmasto E, Reeb V, Rogers JD, Roux C, Ryvarden L, Sampaio JP, Schüßler A, Sugiyama J, Thorn RG, Tibell L, Untereiner WA, Walker C, Wang Z, Weir A, Weiss M, White MM, Winka K, Yao YJ, Zhang N. 2007. A higher-level phylogenetic classification of the *Fungi*. Mycological Research 111: 509–547. doi: 10.1016/j.mycres.2007.03.004

Ho HM, Benny GL. 2007. Two new species of *Syncephalis* from Taiwan, with a key to the *Syncephalis* species found in Taiwan. Botanical Studies 48:319–324.

Ho HM, Benny GL. 2008. A new species of *Syncephalis* from Taiwan. Botanical Studies 49:45–48.

Indoh H. 1962. Studies on Japanese *Mucorales*. I. On the genus *Syncephalis*. Sci. Rep. Tokyo Bunrika Daigaku, Sect. B 11: 1–26.

Kirk PM, Cannon PF, Minter DW, Stalpers JA. 2008. Dictionary of the *Fungi*. CABI: Wallingford (United Kingdom).

Patil MS, Patil BJ. 1994. Studies in *Mucorales*: *Piptocephalidaceae*. Indian Phytopathol. 47: 217–225.

Trufem SFB. 1984. *Mucorales* do estado de São Paulo. 4. Espécies coprófilas. Rickia 11: 53–64.

Viriato A, Trufem SFB. 1985. *Mucorales* do estado de São Paulo. 7. Espécies merosporangiadas. Rickia 12:147–154.